Air Force Research Laboratory|AFRL

Science and Technology for Tomorrow's Air and Space Force

Success Story

ACCES ENHANCES VOICE COMMUNICATION AND SAFETY

The Attenuating Custom Communications Earpiece System (ACCES), developed by the Human Effectiveness Directorate and Westone Laboratories, delivers clear voice communication clarity with improved hearing protection for personnel working around high-performance aircraft at high-power settings. ACCES provides a solution to a long-standing ground safety deficiency associated with tactical fighter aircraft sustainment.

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Accomplishment

Safety issues arose as F-22 jet noise above engine idle impacted voice communication clarity from Raptor test pilots to their crew chiefs and maintainers. Conventional military communication headsets did not generate clear audio signals in high-noise environments, and ready-made, off-the-shelf products could not resolve the problem.

The Air Force requirement to wear earplugs under the headsets on the flightline (for maximum noise protection) further complicates the issue. However, ACCES solves this problem by delivering communication through a hearing protection earphone customized for each user.

Made from maintainers' ear casts, the earphone has a high-fidelity miniature receiver deeply embedded within each earpiece. Combined with the embedded receiver, ACCES permits a robust, high-fidelity speech signal from the miniature loud speaker—even in noise environments as loud as 150 decibels.

ACCES has flexible functionality. The customized design permits deeper ear insertion than that of conventional earplugs, and maintainers can wear the earpiece under chemical/biological protective suits for clear, uninhibited communication.

Furthermore, maintainers can even wear ACCES under conventional headsets, alone when noise levels permit earplug use only, or plugged into the helmet or headset when noise levels increase and requirements change to double hearing protection. ACCES achieves double hearing protection, and over time, achieves protection at a cost much lower than that of today's disposable, one-size-fits-all generic earplugs.

Background

Directorate researchers conducted highly successful field demonstrations with ground crews in 2001. A field study of an improved ACCES prototype yielded similar success. Engine test cell crews also experienced great results. ACCES demonstrates significant advantages concerning ground safety and auditory protection for military aerospace operations.

Directorate researchers conducted controlled lab tests of ACCES speech intelligibility performance and noise attenuation. They will work to combine ACCES with active noise reduction, further enhancing its voice communication delivery and noise protection qualities.

Human Effectiveness
Support to the Warfighter

Additional information

To receive more information about this or other activities in the Air Force Research Laboratory, contact TECH CONNECT, AFRL/XPTC, (800) 203-6451 and you will be directed to the appropriate laboratory expert. (02-HE-16)